UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/934,085	08/22/2001	Rudiger Schutte	32301W198	7366

7590 08/11/2006

Smith, Gambrell & Russell, LLP
Suite 800
1850 M Street, N.W.
WAshington, DC 20036

EXAMINER	
LEUNG, JENNIFER A	
ART UNIT	**PAPER NUMBER**
1764	

DATE MAILED: 08/11/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/934,085	SCHUTTE ET AL.	
	Examiner	Art Unit	
	Jennifer A. Leung	1764	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 June 2006 and 18 May 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-5,7-21,23-33,35 and 36* is/are pending in the application.

4a) Of the above claim(s) *1-5 and 7-16* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *17-21,23-30,33,35 and 36* is/are rejected.

7)☒ Claim(s) *31 and 32* is/are objected to.

8)☒ Claim(s) *1-5,7-21,23-33,35 and 36* are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on May 18, 2006 has been entered.

Response to Amendment

2. Applicant's amendments submitted on June 1, 2006 and May 18, 2006 have been received and carefully considered. Claims 1-5 and 7-16 are withdrawn from consideration. Claims 6, 22 and 34 are cancelled. Claims 17-21, 23-33, 35 and 36 are under consideration.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 35 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention, because "the distributing medium" (line 3) lacks proper positive antecedent basis.

Claim Rejections - 35 USC § 102 and § 103

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 17 and 26 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Lowenstein et al. (US 5,638,900).

Lowenstein et al. (FIG. 1, 2) discloses an apparatus comprising:

a heat exchange assembly **2** in which there are located a plurality of wall elements (i.e., plates **4**), a plurality of tubular cavities (i.e., channels **18**) for conducting a fluid heat-exchange medium (i.e., from inlet **10** to outlet **12**); and a plurality of slot-shaped spaces (i.e., internal spacings **8**);

a) each slot shaped space **8** between formed between lateral surfaces of two spaced apart, substantially equally large and substantially right-parallelpipedal wall elements **4** made of solid plates, said wall elements **4** being arranged interchangeably in a block within a virtual right parallelepiped (i.e., the wall elements **4** are interchangeable, one for another, since each wall element **4** is structurally equivalent);

b) the spaces **8** being able to have fluids supplied from the same side of the block, being oriented to guide the fluids through the spaces **8** in the same direction and in parallel flows; and

c) the plurality of tubular cavities **18** for conducting the fluid heat-exchange medium

through the wall elements **4** being parallel to each other;

wherein the slot-shaped spaces **8** have a slot width of between 0.05 and 5 mm (e.g., a width of about 4 mm; column 6, lines 44-51), and the slot width of spaces **8** is determined by the thickness of spacers **6** (see FIG. 1, 2).

Although the Lowenstein et al. apparatus is merely disclosed as having the intended use of a heat exchanger, the apparatus structurally meets the claims because whether the apparatus is to function as a reactor ultimately depends on the make-up of the particular fluids being guided through the slot-shaped spaces **8**, as well as a particular temperature of the heat-exchange medium being conducted through the channels **18** of plates **4**. In addition, it would have been obvious for one of ordinary skill in the art at the time the invention was made to operate the heat exchange assembly **2** of Lowenstein et al. as a reactor (e.g., by simply feeding reactable fluids through the slot-shaped spaces **8**) because the Examiner takes Official Notice that the use of plate-type heat exchangers for conducting reactions is well known in the art.

5. Claims 17, 19, 24, 26, 28, 29, 33 and 36 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Skala et al. (US 6,132,689).

Regarding claim 17, Skala et al. discloses an apparatus comprising: a reactor (FIG. 1) in which there are located a plurality of wall elements (i.e., each wall element comprising the unit including two plates **10** sealed off by connecting spacer bars **18**; see FIG. 1), a plurality of tubular cavities conducting a heat-exchange medium therethrough (i.e., second channels **16**, for a gaseous or liquid coolant) and a plurality of slot shaped reaction spaces (i.e., first channels **12**);

a) each of said reaction spaces **12** being formed between lateral surfaces **20** of two spaced

apart, substantially equally large and substantially right-parallelepipedal wall elements made of solid plates **10**, and the wall elements being arrangement interchangeably in a block within a virtual right parallelepiped (i.e., the wall elements are interchangeable, one for another, since each wall element **10/18** is structurally equivalent);

b) the reaction spaces **12** being able to have reactants supplied from the same side of the block (i.e., stream **14**), and being oriented to guide the reaction mixture through the reaction spaces **12** in the same directions and in parallel flows (i.e., within each of sections 4A-4D), and

c) the tubular cavities **16** for conducting the heat-exchange medium through the wall element being parallel to each other (see FIG. 1).

Skala et al. further discloses that in an exemplary embodiment, the slot-shaped reaction spaces may have a slot width of between 0.05 and 5 mm (e.g., a width of 0.050 in.; see column 9, lines 7-12). Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to similarly configure a slot width of between 0.05 and 5 mm for the shaped reaction spaces **12** in the reactor shown in FIG. 1 of Skala et al., because it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art, *In re Aller, 105 USPQ 233.*

Regarding claim 19, the apparatus may further comprise a distributing medium on at least one side of the block through which the reaction spaces **12** are capable of being provided with the reactants (i.e., mixing enhancers; see column 9, lines 37-40).

Regarding claim 24, the lateral surfaces **20** of the wall elements facing the reaction spaces **12** are at least partially coated with a catalyst material **24** (see FIG. 1).

Regarding claim 26, the reaction spaces **12** are covered on their narrow sides of the wall

elements extending parallel to the direction of flow of the reactants by plates (i.e., as defined by the common housing **6**) in which there are located openings for feeding and draining a heat-carrier into the wall elements and out of the wall elements.

Regarding claim 28, the wall elements are provided with a group of cavities **16** which extend parallel to the lateral surfaces of the wall elements, and are closed at their ends by the plates of the common housing **6** which are mounted onto the narrow sides of the wall elements, and which the opening for heat exchange medium which are in alignment with the cavities **16** are located (not shown in FIG. 1, but similar to the housing of FIG. 5).

Regarding claim 29, the plates are provided on the outsides and ahead of the openings with flow channels (not shown in FIG. 1, but similar to the cavities **48, 50, 56** formed in end plates **52, 53** in FIG. 2) extending at right angles to the wall elements for at least one of the reactants and/or the heat carrier.

Regarding claim 33, the wall elements are accommodated as a block in a pressure vessel (i.e., as defined by a common housing **6**).

Regarding claim 36, the slot width of the reaction spaces **12** can be changed by varying the thickness of spacers (not shown in FIG. 1; similarly to spacer bars **80, 90** in FIG. 2).

6. Claims 18, 25, 27 and 30 are rejected under 35 U.S.C. 103(a) as obvious over Skala et al. (US 6,132,689) in view of Haseldon (US 3,528,783).

The same comments with respect to Skala et al. apply. In addition, Skala et al. is silent as to the lateral surfaces of the wall elements facing toward the reaction spaces **12** being provided with a provided with a profiled structure. In any event, it would have been obvious for one of ordinary skill in the art at the time the invention was made to provide a profiled structure to the

lateral surfaces of the wall elements in the apparatus of Skala et al. because it is well known in the art to provide profiled structures to heat transfer surfaces in order to promote heat transfer, as evidenced by Haseldon (e.g., Haseldon teaches that heat transfer can be promoted by providing panels which are profiled, or "finned"; see column 4, lines 3-18). The profiled structure will then inherently define at least one feed channel that leads into the reaction space through at least one of the lateral surfaces of the wall elements.

7. Claims 20 and 21 are rejected under 35 U.S.C. 103(a) as obvious over Skala et al. (US 6,132,689) in view of Alagy et al. (US 5,037,619)

Skala et al. is silent as to the distributing medium (i.e., mixing enhancers; see column 9, lines 37-40) comprising a solid body with a plurality of channels, or a packing material with sufficiently small particle sizes and interspaces. Alagy et al. teaches a distributing medium comprising a solid body with a plurality of channels (e.g., monolithic mixers **8**, **3**; FIGs. 1,6). Alagy et al. also teaches a distributing medium comprising a packing material (e.g., ceramic balls **19**; FIG. 6, 7). It would have been obvious for one of ordinary skill in the art at the time the invention was made to substitute the distributing medium of Alagy et al. for the distributing medium of Skala et al. because the distributing medium allows for improved mixing, and any flame resulting from oxidation of a oxidizable will be quenched (Abstract).

8. Claim 23 is rejected under 35 U.S.C. 103(a) as obvious over Skala et al. (US 6,132,689) in view of Pow et al. (US 5,456,889).

Skala et al. is silent as to the reaction spaces **12** being filled with a granular catalyst. Instead, Skala et al. uses a catalyst coating **24** on the surfaces **20** of the reaction spaces. In any event, it would have been obvious for one of ordinary skill in the art at the time the invention

was made to substitute a granular catalyst for the catalyst coating in the apparatus of Skala et al., on the basis of suitability for the intended use, because granular preferential oxidation catalysts are well known in the art, and the substitution of known equivalent structures involves only ordinary skill in the art. *In re Fout* 213 USPQ 532 (CCPA 1982); *In re Susi* 169 USPQ 423 (CCPA 1971); *In re Siebentritt* 152 USPQ 618 (CCPA 1967); *In re Ruff* 118 USPQ 343 (CCPA 1958). For instance, Pow et al. evidences conventionality by teaching a reaction space (channel **22**, between fins **21**) being filled with a granular catalyst **52** (FIG. 5).

Response to Arguments

9. Applicant's arguments with respect to claims 17-21, 23-33, 35 and 36 have been considered but are moot in view of the new ground(s) of rejection.

Allowable Subject Matter

10. Claims 31 and 32 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claim 35 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

The prior art does not disclose or adequately teach the claimed apparatus, additionally comprising plates provided on the narrow sides of the wall elements, wherein a distributing body covers the outside face of the plates, and in which distributing body the flow channels are located. In addition, the prior art does not disclose or adequately teach the claimed apparatus, additionally comprising a lid with a partition and two connecting sockets for feeding two reactants, wherein the partition is capable of being mounted onto the distributing medium.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer A. Leung whose telephone number is (571) 272-1449. The examiner can normally be reached on 9:30 am - 5:30 pm Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn A. Caldarola can be reached on (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Jennifer A. Leung
August 7, 2006

ALEXA DOROSHENK NECKEL
PRIMARY EXAMINER